

WHAT IS CLAIMED IS:

1. A mask comprising a predetermined pattern and
an auxiliary pattern smaller than the predetermined
5 pattern which are arranged so that where a virtual
lattice is assumed which has a lattice point located at
a center of the predetermined pattern, a center of the
auxiliary pattern is offset from the lattice point of
the virtual lattice.

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2. A mask according to aspect 1, wherein the
center of the auxiliary pattern is approximately
located on the virtual lattice.

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3. A mask according to aspect 1, wherein an
offset between a center of the auxiliary pattern and a
corresponding lattice point is $1/6$ to $5/6$ as long
as a period of the virtual lattice.

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4. A mask according to aspect 1, wherein an
offset between a center of the auxiliary pattern and a
corresponding lattice point is $1/3$ to $2/3$ as long
as a period of the virtual lattice.

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5. A mask according to aspect 1, wherein the
auxiliary pattern has an opening, and a center of two

lattice points in the virtual lattice is located at the opening of the auxiliary pattern.

6. A mask according to claim 1, wherein the
5 predetermined pattern includes plural differently sized patterns which attempt to form the same size of patterns on an object to be exposed.

7. A mask according to claim 1, wherein the
10 auxiliary pattern includes first and second auxiliary patterns having different areas from each other.

8. A mask comprising a predetermined pattern and an auxiliary pattern smaller than the predetermined
15 pattern which are arranged so that where a virtual lattice is assumed which has an origin approximately located at a center of the predetermined pattern, the closest auxiliary pattern to the predetermined pattern on the virtual lattice among auxiliary patterns oblique
20 to the predetermined pattern is within a range between 0° and 45° .

9. A mask according to aspect 8, wherein the closest auxiliary pattern to the predetermined pattern
25 on the virtual lattice among auxiliary patterns oblique to the predetermined pattern is within a range between 9° and 40° .

10. A mask comprising a predetermined contact hole pattern and an auxiliary pattern that includes a contact hole smaller than the predetermined pattern which are arranged so that where a virtual lattice is assumed which has a lattice point on the predetermined contact hole pattern, the auxiliary pattern is offset from the lattice point of the virtual lattice.

11. A mask according to aspect 10, wherein an offset is $1/6$ to $5/6$ as long as a period of the virtual lattice.

12. A mask comprising:
plural predetermined patterns; and
an auxiliary pattern smaller than the predetermined pattern, wherein a virtual lattice formed by said plural predetermined patterns defines at least one virtual rectangle, and said auxiliary pattern is arranged at or near a node between diagonal lines.

13. A mask according to claim 12, wherein said plural predetermined patterns and the auxiliary pattern are arranged so that said plural predetermined patterns and the auxiliary pattern have a period in a direction of the diagonal line.

14. An exposure method comprising the step of
illuminating a mask by using light that enables the
predetermined pattern to resolve and prevents the
auxiliary pattern from resolving, and exposing an
5 object using the light from the mask,

wherein the mask arranges a predetermined
pattern and an auxiliary pattern smaller than the
predetermined pattern so that where a virtual lattice
is assumed which has a lattice point located at a
10 center of the predetermined pattern, a center of the
auxiliary pattern is offset from the lattice point of
the virtual lattice.

15. An exposure method comprising the step of
15 illuminating a mask by using light that enables the
predetermined pattern to resolve and prevents the
auxiliary pattern from resolving, and exposing an
object using the light from the mask via a projection
optical system,

20 wherein the mask arranges a predetermined
pattern and an auxiliary pattern smaller than the
predetermined pattern so that where a virtual lattice
is assumed which has a lattice point located at a
center of the predetermined pattern, a center of the
25 auxiliary pattern is offset from the lattice point of
the virtual lattice,

wherein said illuminating step illuminates the mask under an illumination condition that provides bright positions apart from an optical axis by about $r / (4 \cdot \alpha)$ on a coordinate system around the optical axis on a pupil surface in the projection optical system, where r is a radius of a pupil in the projection optical system, and α is a value of a half cycle of the virtual lattice times a numerical aperture of the projection optical system divided by a wavelength of the light.

16. An exposure method comprising the step of illuminating a mask by using light that enables the predetermined pattern to resolve and prevents the auxiliary pattern from resolving, and exposing an object using the light from the mask via a projection optical system,

wherein the mask arranges a predetermined pattern and an auxiliary pattern smaller than the predetermined pattern so that where a virtual lattice is assumed which has a lattice point located at a center of the predetermined pattern, a center of the auxiliary pattern is offset from the lattice point of the virtual lattice,

wherein said illuminating step illuminates the mask under an illumination condition that provides bright positions apart from an optical axis by about 1

/ $(4 \cdot \alpha)$ on a coordinate system around the optical axis on an effective light source, where α is a value of a half cycle of the virtual lattice times a numerical aperture of the projection optical system
5 divided by a wavelength of the light.

17. An exposure method according to claim 16, wherein the effective light source has a dark center portion.

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18. A mask designing method suitable for an exposure method for illuminating a mask by using light that enables the predetermined pattern to resolve and prevents the auxiliary pattern from resolving, and for
15 exposing an object using the light from the mask via a projection optical system, said mask designing method comprising the step of:

arranging the auxiliary pattern such that three beams that are not aligned with a straight line
20 enter a pupil surface in the projection optical system.

19. A method according to claim 18, wherein the three beams are least one of $(-1, 1/2)$ diffracted light, $(-1, -1/2)$ diffracted light, $(1, 1/2)$
25 diffracted light, $(1, -1/2)$ diffracted light, $(1/2, 1)$ diffracted light, $(1/2, -1)$ diffracted light, $(-1$

/ 2, 1) diffracted light and (-1 / 2, -1) diffracted light.

20. A mask designing method suitable for an
5 exposure method for illuminating a mask by using light
that enables the predetermined pattern to resolve and
prevents the auxiliary pattern from resolving, and for
exposing an object using the light from the mask via a
projection optical system, said mask designing method
10 comprising the step of:

arranging plural auxiliary patterns in a
direction other than a periodic direction of the
predetermined pattern and other than a direction
orthogonal to the periodic direction.

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21. A program that enables a computer to execute
a mask designing method suitable for an exposure method
for illuminating a mask by using light that enables the
predetermined pattern to resolve and prevents the
20 auxiliary pattern from resolving, and for exposing an
object using the light from the mask via a projection
optical system, said mask designing method comprising
the step of arranging the auxiliary pattern such that
three beams that are not aligned with a straight line
25 enter a pupil surface in the projection optical system.

22. A device fabricating method comprising the steps of:

exposing an object by using a mask; and
developing the object that has been exposed,

5 wherein a mask arranges a predetermined
pattern and an auxiliary pattern smaller than the
predetermined pattern so that where a virtual lattice
is assumed which has a lattice point located at a
center of the predetermined pattern, a center of the
10 auxiliary pattern is offset from the lattice point of
the virtual lattice.